A

RARE FAMILY HISTORY

OF

Congenital Coloboma of the Iris, etc.

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A RARE FAMILY HISTORY OF CONGENITAL COLOBOMA OF THE IRIS, ETC.

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I WISH here to relate, in detail, the family history referred to by Prof. W. W. Seely in the discussion following the paper on "Multiple Colobomata of the Iris," by Dr. W. F. Mittendorf, in the "Transactions of the American Ophthalmological Society," 20th Annual Meeting, 1884, at p. 738. (In that discussion this family history was referred to as one of *polycoria;* this was, however, a mere *lapsus linguæ.*)

But one member of this family is known to me from personal examination; and his history and present condition I will give first. Seven members in all, so far as I can ascertain, were affected; the anomaly occurring in two generations.

Jeremiah C. Payne (166 W. Eighth St., Covington, Ky.), æt. eighty. P. accurately describes the external appearance of his eyes, and his subjective symptoms during youth and manhood. He had a coloboma of the iris in both eyes. The colobomata were directed downwards and slightly inwards; and were about as wide as an ordinary pupil. Their sides were almost parallel, only slightly converging; and they reached completely to the corneal border. The pupil possessed a certain amount of reaction to light, but less than in a normal eye.

His vision was always extremely poor. He used for reading a pair of very strong convex glasses. Upon visiting him I found a pair of these old glasses, and examined they proved to be + 2½. When reading he used apparently but one eye (by preference the

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right), and the book or paper was held very close, high up, and to the nasal side. His eyes now do not indicate any considerable degree of microphthalmus ; so it is a reasonable assumption that there existed a congenital luxation of the lens. His vision was always so poor, that my questions to elicit whether any power of accommodation was ever present or not, produced only very unsatisfactory answers ; so far as they went, however, they rather negatived this fact. He states, moreover, that he was told by friends that his irides were tremulous. He describes a curious subjective symptom, which was constant as long as he could see at all. When looking at any bright object, as a light or the moon, he perceived a series of very indistinct false images, partially blending together, and arranged in a semicircle above the true image. The most ready explanation of this phenomenon is that it was produced by the irregular upper margin of the partially dislocated lens. A similar phenomenon appeared when reading. The type appeared clean and distinct about the fixation point, and somewhat towards the nasal side, and faded into a rainbow-like blur above and towards the temporal side.

About 1855, or at fifty years of age, his vision began to grow much poorer ; and in the course of four or five years it had diminished so much that only ability to perceive large objects and to go about unassisted, remained. This amount of vision slowly diminished during the succeeding years until only perception of light remained. In 1870 an iridectomy downwards was made in each eye. These soon closed up. About one year later a second iridectomy downwards was made in the left eye. This also soon closed up.

At no time, during all these years, had he any severe pain, or any acute inflammation in either eye.

STAT. PRÆS.—*Right.*—Slight micro-cornea, cornea 10 *mm.* in diam. ; the entire eyeball somewhat atrophic, and tension diminished. Coloboma narrow, ragged, and irregular, the result of the operation of iridectomy. Iris atrophic, dragged downwards and inwards, and adherent to the remnants apparently of an old cataractous, shrunken lens. V = nil, although up to within a few years he had in this eye still the perception between profound darkness and bright sunlight.

Left.—Phthisis bulbi. Cornea opaque and containing some chalky deposits. Grayish exudation nearly filling up the anterior chamber, and containing some chalky plates. An anterior staphy-

loma in the ciliary and equatorial region, upwards and inwards, and occupying the entire space between the internal and superior recti. The sclera here thinned and showing the dark-blue tinge. A similar but larger staphyloma below at the site undoubtedly of the choroidal coloboma, grooved by the inferior rectus, and bulging out to either side of the muscle. Eyeball soft.

Neither eyeball painful nor sensitive to pressure.

FAMILY HISTORY.—Owing to the fact that I have accepted this entire family history upon the statements of one remaining (blind and aged) member of the family, I think it advisable to preface the history proper with the reasons why we may regard these narrations as worthy of implicit credit. I have myself twice, patiently and carefully, noted down the entire history from the old man's lips; once five years ago, and again one year ago. A colleague noted down the history three years ago, during my absence. These three accounts agree absolutely, even to minute details of dates, ages, etc. The old man has that surprising memory for names and dates that we so frequently find among our Western pioneers; which same faculty so often exists among the intelligent blind. In the few instances where I had some check upon the old man's statements I found them perfectly accurate.

FATHER.—Charles B. was a clergyman. Eyes light gray, normal in appearance, and vision good. Fond of hunting and an excellent shot.

MOTHER.—Mary Ann. Eyes dark, normal in appearance, and vision good. Did all the family sewing. Father and mother were not related, and both lived to be over ninety. They had eight children.

WILLIAM H.—About twelve years older than our patient. Vision perfect; he went West, and became a trapper and guide. Died at seventy; no children.

(1). BELINDA.—About ten years older than J. Had iris-coloboma, both eyes, directed downwards and inwards. They were conical, so that she had the appearance of having immense pupils. Pupils reacted. She had better vision than J., and less difficulty in reading. In a dim light she had something of the same optical phenomenon. For example, in looking at the moon she saw three or four very indistinct false images blended into a

halo-like arc above. Probably the lens was dislocated downwards in a slight degree. She died at about sixty years of age, and some years before her death our patient heard that her vision had become very decidedly worse.

(2) SUSAN.—About eight years older than J. This sister had eyes almost identically like those of our patient. The colobomata had the same appearance, perhaps a trifle wider and a little more conical, and vision was equally bad. They could use each other's glasses with equal facility. She held her book while reading just as J. did ; but she lacked the optical symptom. At the time of my first examination we made inquiries concerning her, and received some rather vague information. She was then over eighty, and had for many years been entirely blind in the left eye, and almost blind in the right. Some years previous the left eye had been enucleated (why, I could not ascertain), and some time previous an operation (what, I could not ascertain) had been made upon the right eye. This produced only temporary, if any, improvement.

ANN.—About four years older than J. Eyes normal and vision good. Died aged fifty-nine.

(3) JEREMIAH.—Our patient.

PENELOPE.—About five years younger than J. Eyes normal and vision good. Died aged 41.

(4) ABIGAIL.—About ten years younger than J. Eyes in appearance very like those of our patient, only pupils rather smaller and placed lower, and the colobomata rather narrower. Her vision was, however, much the worst of the entire family. Could not read the largest type, even when held close to the eyes and using J's glasses. In the house, upon dark and gloomy days had to feel her way about. She had nystagmus. Died aged twenty.

(5) CHARITY.—The youngest, about sixteen years younger than J. Had coloboma of the iris in each eye, directed downwards. The pupils and colobomata were rather small, and the latter do not seem to have been complete, a very narrow band of iris remaining at the periphery. Her vision must have been good, for she had commenced to learn to spell and read when she died, at the age of six.

SECOND GENERATION.—Belinda had two daughters and a son. Eyes of all normal. All three dead.

Susan had two daughters. Younger normal.

(6) ELDER DAUGHTER.—Had eyes, both in external appearance and as regards vision, very much like those of her mother. Died without children.

Ann had several children. All except one daughter died during childhood. Eyes all normal.

Jeremiah has had two children. One died young, eyes normal.

(7) DAUGHTER SUSAN.—She is now forty years old. Has colobomata of the iris, directed downwards and inwards. The irides are brown. The pupils are very slightly displaced downwards, and have good reaction. The colobomata are about as wide as the ordinary pupil, and somewhat conical. The left is complete, reaching to the periphery; the right has a very narrow band of iris remaining at the periphery. Her vision is very good. I have not seen this daughter, she having gone some years ago to California, but the father has a large, old-fashioned photograph of her; and although the photographer had "retouched" the eyes and attempted to obliterate these defects, this was so poorly done that careful examination shows the above details quite clearly. Moreover, I have had these details corroborated by a neighbor who, as a young man, had such intimate friendly relations with the young woman, that he should be an authority on the subject of her eyes.

Penelope had six children. All normal.

THIRD GENERATION.—Little known. All normal so far as is known.

We can more readily glance over this family history in the following tabulated form:

Father Mother (Normal)	William	
	Belinda	Three children (Normal)
	Susan	Daughter Daughter (Normal)
	Ann	Several children (Normal
	Jeremiah	Boy (Normal) Susan
	Penelope	Six children (Normal)
	Abigail	
	Charity	

REVIEW OF ANALOGOUS CASES.

Cases of congenital anomalies of the uveal tract, which show a distinct hereditary influence, by occurring among two or more members of the same family, or by occurring in successive generations, are rare; but the literature of this subject furnishes a number of examples. The above family, both as regards the number of members affected in the first generation, and the hereditary influence so nicely shown by the defect passing down two separate branches, must, in this respect, take its place first in the literature of coloboma of the iris; and under the more general head of congenital anomalies of the uveal tract it stands second only to the famous case of the Kehl family, in the village of Gravenrode, in Thüringen, and the remarkable family recorded by Galezowski.

Gutbier reports in a Würzburg dissertation ("De Irideremia, seu Defectu Iridis." Diss. ophthal.-inaug., Wircebergensis, 1834) this first family, in which among four generations there occurred ten cases of irideremia, or complete or partial absence of the iris. The following table will show this clearly:

A Kehl, C. (Irideremia)	B (Irideremia)	E (Irideremia)	Normal
		F (Irid. part.)	I (Irideremia)
			Normal
		G (Irideremia)	J (Irideremia)
			(K) A monster)
		H (Irideremia)	Normal
	C (Irideremia)	Normal .	Normal
	D (Irideremia)	- - - - - -	
	5 Normal		

In this family the defect passes to the third and fourth generations in only one line among eight children. Of these ten cases eight were males and two females.

Galezowski reports (*Recueil d'Ophthalmologie*, 1880) a family history that is still more marvellous. In this family twenty-seven cases of irideremia were found in three generations, here the female sex predominating.

(These two families are so remarkable in showing an hereditary transmission that I introduce them here; although they are not strictly analogous to the family I report above, a different anomaly of the iris existing.)

Mother (Irideremia)	Daughter (Irideremia)	Not known
	Daughter (Irideremia)	Twelve children (ten now dead) *all* irideremia
	Daughter (Irideremia)	Two children *both* irideremia
	Nine other children (now dead) *all* irideremia	- - - -

Streatfield reports (*Roy. Lond. Ophth. Hosp. Rep.*, vol. i., p. 153, 1858) a family history more nearly parallel to this I report than any other I have found in the literature. Here two brothers were affected with iris-coloboma; and one of these transmits it to his son and grandsons—together seven cases, all males.

Brother - - - - - - - - - -		
Brother	Son	Grandson
	Daughter (Normal)	Grandson
		Grandson
		Grandson

In the grandsons the colobomata were either small, or were only deep notches; or, as in one eye of one, a mere notch with a band looking like a cicatrix running downwards from it. As V was very good in all, the defect was probably limited to the iris, as was the case in those that came under examination.

Rosas reports (*Handbuch der theoretischen und praktischen Augenheilkunde*, Bd. i., p. 283, Wien, 1830) the case of a mother with iris-coloboma in both eyes, among whose five children two were similarly affected, one having iris-coloboma in the right, and the other having it in both eyes.

Stoeber reports (*Gazette médicale de Strasbourg*, 1844) the case of a man who had lost his right eye by an accident. His daughter had microphthalmus with coloboma of the iris in the left eye. Her elder son had microphthalmus with iris-coloboma in both eyes, and her younger son had the same defects in the right eye.

Cunier reports (*Annales d'Oculistique*, 1845) an interesting family history. A man (normal) whose grandmother was a deaf-mute married a woman (normal) whose mother had microphthalmus. They had two daughters; the first had microphthalmus in both eyes, while the second had microphthalmus with irideremia

totalis, and was a deaf-mute. The first daughter has a son who is a deaf-mute, and has microphthalmus in both eyes with coloboma of the iris in the right.

Gescheidt reports (Ammon's *Zeitschrift für Ophthalmologie*, Bd. 4, 1834) the case of a man with iris-coloboma whose fifth child, a daughter, also had iris-coloboma, the older children being normal.

Stilling reports (Ammon's *Zeitschrift*, Bd. 5) the case of a girl with iris-coloboma, one of whose parents had the same defect.

Ewers reports ("Zweiter Jahresbericht über die Wirksamkeit der Augenklinik," Berlin, 1872) a case of coloboma of the iris and choroid where the mother was known to have coloboma of the iris.

Two other cases of the same defect observed by him occurred in a brother and sister.

Gleitsmann reports (*Ueber ein Colobom der Chorioidea*, Inaug.-Diss., Greifswald, 1874) the case of a girl with coloboma of the iris and choroid, in both eyes, whose mother has iris-coloboma in the right eye.

Streatfield reports (*Roy. Lond. Ophth. Hosp. Rep.*, vol. i., p. 154) the case of a man with iris-coloboma, both eyes, whose sister and two cousins have the same defect. He stated that his grandfather had the same defect, but the direct transmission could not be traced.

Fichte reports (Henle und Pfeufer's "Zeitschrift für rationelle Medicin," N. F., Bd. 2) two cases of iris-coloboma occurring in children in the same family.

Hoffmann reports ("Ueber ein Colobom der inneren Augenhäute ohne Colobom der Iris," Inaug.-Diss., Bonn., 1871) a case of a woman with choroidal coloboma, whose brother has coloboma of the iris and choroid.

Marty reports ("Contribution à l'étude du coloboma de la choroide et de l'iris." Thése de Paris, 1880) two cases of coloboma of the iris and choroid in both eyes in a brother and sister.

Hirschberg observed Becker ("Zur Anatomie der gesunden und kranken Linse," p. 136; da Gama Pinto, *Archiv. für Augenheilkunde*, vol. xiii.) the case of a woman with coloboma of the iris and choroid, whose brother had coloboma of the iris, choroid and optic nerve.

(The following cases were not accessible to me in the originals; the references are taken from: Gescheidt, "De colobomate

iridis," Lipsiæ, 1831 ; Rau, "Die Krankheiten und ursprünglichen Bildungsfehler der Regenbogenhaut," Bern, 1845 ; and Wilde, "Essay on the Malformations and Congenital Diseases of the Organs of Sight," London, 1862.)

Bartholinus ("Acta medica et philosophica Hafniensia," 1673) describes and figures a case of iris-coloboma which was hereditary.

Block mentions ("Medizinische Bemerkungen," Berlin, 1774) a family in which the father, his children, and his nephews and nieces had coloboma of the iris. In one daughter and in one nephew the defect occurred in but one eye, in the rest it was present in both eyes.

[The cases described by Helling (Berlin, 1821) and by Rudolphi (Berlin, 1823) belong to this same family.]

Hagström reports ("Abhandlungen der königlichen schwedischen Academie der Wissenschaften," Bd. 36, Leipsig, 1781) a whole family in which each member had iris-coloboma.

Acrell (in the same vol.) reports a case of iris-coloboma which was hereditary.

Conradi knew ("Handbuch der pathologischen Anatomie," Hanover, 1796) a man whose father, sister, and niece had coloboma of the iris. That is to say: father, daughter, and granddaughter in line.

Erdmann reports ("Zeitschrift für Natur- und Heilkunde," vol. iv., Dresden, 1826) a man with coloboma of the iris, both eyes. He had had six children. Of the two living, one, a boy, had the same defect, both eyes. Of the dead children, one, a boy, was known to have had iris-coloboma, both eyes.

Heyfelder reports ("Abhandlungen der Leopoldina Carolina Akademie der Naturforscher," vol. xiv., Berlin, 1829) a family where the mother had iris-coloboma, both eyes. She had three children ; the first two, twins, one was normal, the other, a boy, had the same defect, both eyes ; the younger child, a girl, had iris-coloboma, both eyes.

Himly has observed in one instance three children in one family affected with iris-coloboma ; and in another instance he has observed a father and a son both presenting this anomaly.

This same hereditary influence has been noted in cases of *iridermia* reported (in addition to the above two) by Henzschel, Focachon, Ruete, Cooper, Schröter, Laskiewicz-Friedensfeld, Page, Benton, Rainsford, Wells, Heuner, and Streatfield.

In cases of *corectopia* reported by Schwartz, Mooren, Williams (E.), Graefe, Frickhöffer, Wells, Schaumberg, and Breitbarth.
In the case of *polycoria*, mentioned above, by Mittendorf.

REMARKS.

I have taken the pains to call attention to what material exists in the literature, within my knowledge, clearly and unmistakably showing a distinct hereditary influence, because Prof. Manz, the greatest living authority upon this subject, treats this influence lightly and is somewhat disposed to doubt its importance. In the second volume of Graefe and Saemisch's "Handbuch der gesammten Augenheilkunde," in his chapter "Die Missbildungen des menschlichen Auges," at p. 86, he refers to this point as follows: "With this anomaly, its presence in several members of one family is of especial interest, for here, at once, the etiological influence of heredity is conceivable. And in fact observations are not lacking where this anomaly was found in several members of the same family and also in parents and children. These latter cases, which especially would speak for inheritance, appear, however, to occur seldom. However prone one may be, in these congenital anomalies, to think of heredity; however impressive the individual positive cases in question may be; still they are far too few to allow of the basing upon them of any particularly trustworthy etiological factor."

When we consider, however, the relatively limited number of cases which form the sum-total of our recorded observations, and can find among these the number above quoted, where the hereditary influence is shown clearly and unmistakably, we are compelled, I must believe, to recognize the existence of some sort of disturbance which has an hereditary influence, however vague and indefinite our ideas may be as to what this influence really is, or how it acts.

Arlt long ago insisted on the influence of heredity in these cases, and even was so explicit as to state that it came generally from the paternal side. However, among twenty-six examples recorded above, ten were direct from the

father and eleven direct from the mother; two indirect through the father, and three indirect through the mother; the few remaining cases were too indefinite to ascertain this relation. From this it would seem that neither sex has any preponderating influence.

Even experimental results give weighty evidence in favor of this view. Deutschmann has reported (Zehender's *Monatsblätter für Augenheilkunde*, 1880) the following remarkable example. Two rabbits were paired: the male had received a tubercular inoculation in the anterior chamber, and the iris tubercle had left an atrophic segment in the lower part of the iris; the female had merely received an injection of some indifferent material into the vitreous. Of a litter from this pair, one had different colored irides in the two eyes; and another had a coloboma of the iris and choroid in both eyes.

This is, so far as I know, the only case of iris- and choroidal coloboma that has been produced, but Deutschmann, Samelsohn, and Brown-Séquard have produced other anomalies (more particularly microphthalmus) by similar experiments.

There is one point in these cases to which, on account of its important practical bearings, I wish to draw particular attention, and that is as regards the gloomy prognosis where the defect is, in any way, of considerable extent. Arlt and some of the older authors hint at this danger, but no particular stress has, in recent years, been laid upon this point. We recognize this condition at once as a congenital malformation, and dismiss it as such without further consideration. A study of the literature convinces me that quite a large proportion of these cases terminate in blindness in later years, and if these cases could, as a rule, be kept under observation, I believe that this would be demonstrated much more frequently than it has been in the past. This seems to result from a very slow and insidious form of chronic inflammation, or degeneration, attacking the uveal tract, and very prone, among other changes, to produce secondary cataract.

The results of the few histological examinations that

have been made of colobomatous eyes bear testimony in this direction.

Haase reports (Graefe's *Archiv für Ophthalmologie*, Bd. xvi., 1870) the first examination of this kind, made upon an eye removed by Laurence (St. George's Hosp.) on account of threatening sympathetic inflammation in the other eye, in a girl of fifteen. The sclera was thin and bulging at the coloboma and thickened at its borders ; choroid somewhat atrophic, vessels small, with their walls thickened, and a richer development of vessels at the borders of the coloboma ; choroid covering the coloboma thin and atrophied ; retina here lacking, at other places showing calcareous patches, only at few points the normal retina still remaining ; vitreous infiltrated ; optic nerve atrophic.

Hirschberg reports (*Centralblatt für praktische Augenheilkunde*, p. 265, 1881) the results of the anatomical examination of such an eye. The eye was painful and sensitive to pressure. The lens was opaque and V was destroyed. Enucleated the eyeball showed the changes of phthisis bulbi, a result of cyclitis. Cornea showed new vessels ; sclera thinned and staphylomatous below ; iris atrophic and adherent to the cornea and the lens ; ciliary body atrophic and showing inflammatory products ; choroid atrophic, over the coloboma a mere membrane with remnants of the normal structures and devoid of pigment ; retina completely detached and atrophic ; lens opaque and shrunken ; vitreous fluid.

In deciding whether this cyclitis and the resulting changes have occurred in this colobomatous eye merely as a coincidence, or whether the coloboma stands as the causal factor, Hirschberg holds to the latter view.

Da Gama Pinto describes (*Archiv für Augenheilkunde*, vol. xiii., Wiesbaden and N. Y.) another eye removed by Hirschberg. This eye had been blind for a year, and was painful and sensitive to pressure. The iris was hypertrophied and adherent to the cornea at the periphery ; ciliary body showed a previous cyclitis ; coloboma was covered with a fibrillar membrane of connective-tissue continuous at the borders with the choroid, retina, and optic nerve ; sclera here bulged somewhat and showed changes ; choroid pigmented, thickened, and the capillaries congested ; there were numerous colloid excrescences ; retina is detached and degenerated ; vitreous degenerated,

fibrillated, and vascular ; lens semi-transparent, with capsular cataract ; optic nerve atrophic.

Arlt (*Krankheiten des Auges*, Bd. ii.) and several of the older authors have found similar changes existing to a greater or lesser extent ; but the cases were not examined microscopically.

Conversely, in all of the few cases of colobomatous eyes that have been examined from very young children, these secondary inflammatory changes do not seem to have occurred.

Gescheidt examined (Ammon's *Zeitschrift für Ophthalmologie*, Bd. 4) the eyes of a child six months old. He reports sclera, choroid, retina, and vitreous normal (macroscopically, I suppose).

Pause examined (Graefe's *Archiv für Ophthalmologie*, Bd. 24) the eyes of a female infant who died at birth. She had a coloboma of iris and choroid. The sclera, choroid, and retina were found to be normal under the microscope. The pigment-epithelium being deficient in pigment over the coloboma, as the only anomaly existing in the fundus : " Eine partielle Leucosis des Pigmentepithels."

Manz examined (Zehender's *Monatsblätter für Augenheilkunde*, 1876) the eyes of a little child who died in the Rostock Clinic. Attention is, to be sure, directed particularly to the histological character of the floor of the coloboma ; but no pathological changes of importance in the various tissues are mentioned.

Clinically the development of such changes as I describe have been observed in quite a number of cases reported in the literature of this subject.

The older authors, Bloch, Beer, Rathke, Lechla, Helling, M. Jaeger, Jüngken, Wutzer, Gescheidt, Romberg, Schoen, Ammon, Fichte, and Sichel, call attention to the tendency in eyes affected with iris-coloboma to the development of cataract ; but they do not in all cases draw a sharp distinction between iris-coloboma and irideremia, which is so frequently associated with congenital cataract, or results in the development of cataract ; and corectopia, which being so often associated with ectopia lentis, shows this same tendency.

In the above family which I report, the three members who reached a ripe old age all became blind late in life. In one of

these, at least, and most probably in the other two also, from the chronic changes above described.

Another case has come under my observation—the patient from whom Jaeger made his drawings of coloboma of the choroid ("Beiträge zur Pathologie des Auges," zweite Auflage, T. xlv. and xlvi.; and the "Ophthalmoscopischer Hand-Atlas," Figs. 87 and 88); she being at that time thirteen years of age. I saw her in Vienna in 1883 in Dr. Dimmer's ophthalmoscopic class. Now over forty, her right eye (T. xlvi. and Fig. 88) presented just these changes above described, the result of an insidious chronic uveitis. Secondary cataract had supervened, and the fundus was no longer visible. V was nil; but the eyeball not painful.

Arlt had seen (*Krankheiten des Auges*, Bd. ii., p. 123,) eight cases of iris-coloboma; and in three of these an opacity of the lens had later supervened.

Dixon reports (*Roy. Lond. Ophth. Hosp. Rep.*, vol. i., p. 108,) a case of iris-coloboma where the vision, previously good, began to fail at the age of twenty-six. At forty the right had a chalky lens; the left a hazy lens with still fair vision.

Leber reports (Nagel's *Jahresbericht über Ophthalmologie*, p. 223, 1870) a case of a man with choroidal coloboma who came complaining of a gradual impairment of vision. There was an extensive defect in the field of vision, much larger than would correspond to the coloboma.

Heyl reports ("Report of the Fifth International Ophthalmological Congress," Phila., 1876) a case of a man aged fifty-one with iris-coloboma and notching of the lens below. In the L E sight had been lost for some time; pupil occluded, and lens opaque and calcareous. R E media somewhat cloudy, and vision failing.

Williams (E.) reports (in the above discussion) a case of a woman, aged thirty, with iris-coloboma. The lenses became luxated downwards. Kept under observation they became opaque, were mostly absorbed, and with proper cataract glasses good vision was secured.

Higgins reports (*Lancet*, Dec., 1877) a case of a man, aged fifty-seven, with iris-coloboma and cataract in both eyes. The right had been blind for forty years, the left since a few months. After extraction a choroidal coloboma was found in each eye. The right set up iritis and the pupil closed; the left had

a subsequent hemorrhage into the vitreous, but finally secured V = $\frac{1}{6}$ with + 12 D.

Marty's cases (quoted above). The sister's vision, always poor, began to fail after twenty. She is blind, with cataract, in the right ; and vision is very poor in the left. The brother, always "near-sighted," lost his vision gradually. Now blind, with cataract, in the left ; and very poor vision in the right.

Badal reports (*Gazette des Hôpitaux*, Mai, 1880) the case of a man with iris-coloboma and cataract. He had been operated upon in one eye twenty years previous, and lost it by irido-cyclitis supervening. In the other eye was a fully developed cataract, which had possibly been a congenital zonular cataract; at any rate, it had become completely opaque in later years. After extraction a large choroidal coloboma was found.

Hirschberg's first case (quoted above) was in a woman of twenty-four. Owing to a lack of intelligence on the part of the patient, it could not be determined how long these chronic changes had been going on.

In his second case, examined by Dr. da Gama Pinto, also quoted above, the patient was a woman (an adult, but age not given) whose eye had been blind for one year.

In quite a number of other cases in the literature is the presence of cataract or some of the other above-mentioned changes noted ; but the details are not given with sufficient definiteness to determine accurately when or how these changes developed.

Schoen, Fichte, Talko, and Kipp of Newark, N. J., have seen cases of coloboma of the iris or choroid in which glaucoma or cataracta glaucomatosa supervened late in life.

Another point of practical importance that even this meagre array of cases seems to furnish, is that operative measures on eyes of this character are very prone to result disastrously, or are very likely to prove of negative or only temporary value.

These cases will harmonize very well with the views of Deutschmann, although his view is not necessary to their explanation, or essential to this discussion. Deutschmann examined (Zehender's *Monatsblätter für Augenheilkunde*, 1881) the eye of a rabbit in which there was a coloboma of the iris and choroid. In the region of the coloboma of the choroid he found distinct signs of a sclero-choroido-retinitis,

which had not yet disappeared. This led him to the explanation of the origin of the coloboma as resulting from the arrested development of the eye due to this intra-uterine inflammation; this inflammation at this point in the embryonic eye preventing the closure of the fœtal cleft, or allowing it to again open. It can then readily be conceived, and this explanation for these very cases seems most happy, that a coloboma originating in this manner from original inflammatory changes at this point, would be prone to be the starting-point of future inflammation.